Appendix I.   Potential UCBN partners

- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- Burke Museum of Natural History and Culture
- Confederated Tribes - Colville Reservation
- Confederated Tribes of Warm Springs
- Cooperative Ecosystem Studies Units
- County Governments
- Idaho Conservation Data Center
- Idaho Department of Fish and Game
- Idaho Geologic Survey
- Idaho Museum of Natural History
- Idaho State Climate Services
- Idaho State University
- Land Trusts
- Montana Natural Heritage Program
- National Gap Analysis Program
- National Resources Conservation Service
- Nez Perce Tribe
- Oregon Department of Fish and Wildlife
- Oregon Museum of Science and Industry
- Oregon Natural Heritage Program
- Oregon State University
- Private Landowners
- Sawtooth Science Institute
- School Districts
- Spokane Tribe of Indians
- The Nature Conservancy
- United States Fish and Wildlife Service
- United States Forest Service
- United States Geological Survey
- University of Idaho
- University of Washington
- Washington Dept. of Fish and Wildlife
- Washington State University

Appendix J.   Upper Columbia Basin Network Species of Concern List

Sources:
Montana Natural Heritage Program
Idaho Conservation Data Center
Washington Natural Heritage Information System
Washington Department of Fish and Wildlife
Oregon Natural Heritage Program

Note: State lists were crosschecked against existing UCBN species lists, the NPSpecies database, and individual park lists. Unconfirmed species are indicated with the symbol (x).

Name	BIHO	CIRO	CRMO	HAFO/MIIN	JODA	LARO	NEPE	WHMI
Birds								
American White Pelican		x		x		x	x	
Bald Eagle (T)	x	x	x	x	x	x	x	x
Black Tern			x					
Burrowing Owl		x	x	x				
Columbian Sharp-tailed Grouse			(x)					
Common Loon					x		x	
Common Nighthawk					x			
Eastern Oregon Willow Flycatcher					(x)			
Ferruginous Hawk	x	x	x	x		x	x	x
Golden Eagle						x		x
Great Egret				x				
Greater Sage Grouse (Petitioned)		x	x	(x)				
Greater Sandhill Crane					x	x		x
Lewis's Woodpecker					x	x		x
Loggerhead Shrike		x	x	x	x	(x)		x
Long-billed Curlew		x	x	x				
Merlin						x		x
Mountain Quail					x			

Name	BIHO	CIRO	CRMO	HAFO/MIIN	JODA	LARO	NEPE	WHMI
Northern Goshawk	x	x	x	x	x	x		x
Northern Pygmy-owl		x					x	
Peregrine Falcon			x	x	x	x		x
Pileated Woodpecker						x		x
Sage Thrasher						x		
Three-toed Woodpecker							x	
Tricolored Blackbird					x			
Vaux's Swift						x		x
Western Bluebird					x			
Western Grebe						x		
Western Meadowlark					x			
White-faced Ibis			x		x			
White-headed Woodpecker						x		
Yellow-breasted Chat					x			
Mammals								
California Bighorn Sheep					x			
Canada Lynx (T)	(x)							
Cliff Chipmunk		x						
Fringed Myotis		x	x	(x)	x	x	(x)	
Gray Wolf (EXPN)	x		(x)					
Grizzly Bear (T)	(x)							
Kit Fox			(x)					
Long-eared Myotis		x	x	(x)	x	x		

Name	BIHO	CIRO	CRMO	HAFO/MIIN	JODA	LARO	NEPE	WHMI
Long-legged Myotis		x	x	(x)	x			
Merriam's Shrew		(x)	(x)	(x)	(x)	(x)		
Pallid Bat					x			
Pygmy Rabbit (Petitioned)		(x)	(x)					
Silver-haired Bat					x			
Spotted Bat		x			x	(x)	(x)	
Townsend's Big-eared Bat		(x)	x	(x)	x	(x)	(x)	
Western Small-footed Myotis		x	x	(x)	x			
Yuma Myotis			x	(x)	x	x		
Herpetofauna								
Columbia Spotted Frog (Candidate)	(x)		(x)			(x)	(x)	
Common Garter Snake			(x)		x			
Ground Snake				(x)				
Longnose Snake				(x)				
Mojave Black-collared Lizard			(x)					
Northern Leopard Frog			(x)	(x)				
Ringneck Snake							x	
Short-horned Lizard			x					
Western Rattlesnake					x			
Western Toad	(x)	x	(x)		x	x	x	(x)
Fish								
Arctic Greyling	(x)							
Bull Trout (T)					x	x		
Interior Redband Trout					x			
Malheur Mottled Sculpin					x			
Pacific Lamprey					x			
Steelhead, Middle Columbia ESU (T)					x			

Name	BIHO	CIRO	CRMO	HAFO/MIIN	JODA	LARO	NEPE	WHMI
Invertebrates								
Banbury Springs Limpet (Lanx) (E)				(x)				
Blind Cave Leiodid Beetle			x					
Bliss Rapids Snail (T)				(x)				
Desert Valvata				(x)				
Idaho Dunes Tiger Beetle			(x)					
Idaho Pointheaded Grasshopper			(x)					
Idaho Springsnail (E)				(x)				
Snake River Physa (E)				(x)				
Plants								
Allium aaseae			(x)					
Allium anceps			x					
Antennaria arcuata			(x)					
Antennaria parvifolia						x		
Astragalus atratus var. *inseptus*			x	x				
Astragalus collinus					x			
Astragalus diaphanus var. *diurnus*					x			
Astragalus oniciformis			x					
Astragalus pushii var. *ophiogenes*				x				
Botrychium spp. (Candidate)					(x)			
Cymopterus davisii		x						
Downingia bacigalupii			x					

Name	BIHO	CIRO	CRMO	HAFO/MIIN	JODA	LARO	NEPE	WHMI
Eriogonum shockleyi var. *shockleyi*				x				
Luina serpentina					x			
Mimulus evanescens					x			
Oxytropis campestris var. *columbiana*						x		
Pediocactus simpsonii		x						
Penstemon lemhiensis	x							
Phacelia inconspicua			x					
Polystichum kruckebergii		x						
Pyrrocoma insecticruris			x					
Salix candida						x		

Appendix K.   Noxious Weeds of UCBN Parks

Note: This list was assembled from "top 10" lists provided by each network park, EPMT reports, and 2003 University of Idaho weed team reports.

Common Name	Scientific Name	BIHO	CIRO	CRMO	HAFO	JODA	LARO	MIIN	NEPE	WHMI	Total
Canada Thistle	*Cirsium arvense*	x	x	x	x		x	x	x	x	8
Spotted Knapweed	*Centaurea maculosa*	x	x	x		x	x		x		6
Toadflax	*Linaria spp.*	x	x	x		x	x		x		6
Cheatgrass	*Bromus tectorum*	x		x	x	x		x		x	6
Scotch Thistle	*Onopordum acanthium*		x	x				x	x	x	5
Yellow Starthistle	*Centaurea solstitialis*					x	x	x	x	x	5
Diffuse Knapweed	*Centaurea diffusa*	x		x	x	x	x				5
Russian Knapweed	*Acroptilon repens*	x		x		x	x	x			5
Field Bindweed	*Convolvus arvensis*	x	x		x			x	x		5
Rush Skeletonweed	*Chondrilla juncea*			x	x		x	x			4
Houndstongue	*Cynoglossum officinale*		x			x	x		x		4
Bull Thistle	*Cirsium vulgare*	x	x		x			x			4
Common Mullein	*Verbascum thapsus*				x		x	x			3
Poison Hemlock	*Conium maculatum*		x						x	x	3
Leafy Spurge	*Euphorbia esula*	x		x			x				3
Common Tansy	*Descuriania pinnata*	x		x					x		3
Musk Thistle	*Carduus nutans*		x					x			2
Prickly Sowthistle	*Sonchus asper*				x			x			2
Common Teasel	*Dipsacus fullonum*				x				x		2
Black Henbane	*Hyoscyanus niger*	x	x								2
Bedstraw	*Galium aparine*									x	1
Burdock	*Arctium minus*							x			1
Chicory	*Chicorium intybus*		x								1
Dyer's Woad	*Isatis tinctoria*		x								1

Common Name	Scientific Name	BIHO	CIRO	CRMO	HAFO	JODA	LARO	MIIN	NEPE	WHMI	Total
Kochia	*Kochia scoparia*									x	1
Longspine Sandbur	*Cenchrus longispinus*						x				1
Medusahead	*Elymus caput-medusae*					x					1
Perennial Pepperweed	*Lepidium perfoliatum*					x					1
Prickly Lettuce	*Lactuca serriola*									x	1
Puncturevine	*Tribulus terrestris*						x				1
Purple Loosestrife	*Lythrum salicaria*				x						1
Reed Canary Grass	*Phalaris arundinaceae*									x	1
Russian Thistle	*Salsola kali*						x				1
Saltcedar	*Tamarix ramosissima*				x						1
Spikeweed	*Hemizonia pungens*									x	1
Whitetop	*Cardaria draba*					x					1

Appendix L.   Prioritized Stressors Affecting Park Natural Resources in the Upper Columbia Basin Network

Stressor: any physical, chemical, or biological entity or process that can induce an adverse response. For purposes of monitoring, stressors are considered to be anthropogenic factors that are outside the range of disturbances naturally experienced by the ecosystem.

Priority Scale: High=3, Medium=2, Low=1, None=0; Priority reflects degree to which stressor is impacting park resources NOT a prioritization of future monitoring activities.

Stressors	BIHO	CIRO	CRMO	HAFO	JODA	LARO	MIIN	NEPE	WHMI	Total
Exotic Plants	3	3	3	3	3	3	3	3	3	27
Agriculture on Adjacent Lands (Water Diversion, Chemical Use, Livestock etc…)	3	1	2	3	2	2	3	2	3	21
Fire Management Practices (NPS and Adjacent Lands)	2	2	2	2	3	3	1	2	2	19
Other NPS Management (Weed Control, Agriculture, Restoration, Reintroductions, etc…)	3	2	1	1	2	2	3	2	3	19
Other Historic Human Impacts (Sagebrush Removal, Irrigation etc…)	2	1	1	3	2	1	3	2	3	18
NPS Development (Facilities, Trails, Campgrounds, Roads, etc...)	3	3	1	1	1	2	1	3	1	16
Historic Livestock Grazing	2	3	2	2	2	1	2	2	0	16
Visitation/Recreation (Boating, Hiking, Climbing, ORV, etc…)	1	3	2	1	1	3	1	1	1	14
Historic Fire Suppression	2	2	2	1	2	2	1	2	0	14

Stressors	BIHO	CIRO	CRMO	HAFO	JODA	LARO	MIIN	NEPE	WHMI	Total
Landscape Fragmentation	2	1	1	1	1	1	2	2	3	14
Exotic Animals (Including Livestock Trespass)	1	1	1	1	2	2	1	1	3	13
Extreme Disturbance Events (Flood, Fire, Drought, Landslides, etc…)	1	1	1	3	1	1	1	1	1	11
Wildlife Impacts (Browsing, Other Damage)	1	1	1	1	2	1	1	1	1	10
Global Warming/Climate Change	1	1	2	1	1	1	1	1	1	10
Hunting (NPS and adjacent lands)	1	1	1	1	1	2	1	1	0	9
Urban Development (Housing, Roads etc…)	1	0	1	0	0	2	1	1	3	9
Exotic Disease Organisms	1	2	2	0	0	0	1	1	1	8
Forest Management Practices (NPS and Adjacent Lands)	2	0	1	0	0	3	0	2	0	8
Dams or Reservoir Operations	0	0	0	3	0	3	0	0	0	6
Permitted Livestock Grazing	0	3	0	0	0	3	0	0	0	6
Utilities/Industry	0	0	1	1	0	3	0	1	0	6
Collection/Poaching	0	1	1	1	2	1	0	0	0	6
Air Traffic	0	1	2	0	0	1	0	0	0	4

Appendix M.   The UCBN Vital Signs and Associated Monitoring Objectives for Phase 1.

Level 1	Level 2	UCBN Vital Sign	Monitoring Objective	Monitoring Category
Air and Climate	Air Quality	Air Chemistry - ozone	Determine status and track trends in ozone injury occurring in sensitive plant species across the UCBN.	Stressor Effects
		Air Chemistry-Emissions	Determine status and track trends in atmospheric pollutant emissions present in UCBN parks from adjacent agriculture, urbanization, and industry.	Stressor Effects
		Air Chemistry-Mercury	Track trends in mercury deposition at LARO.	Stressor Effects
		Visibility	Track trends in UCBN viewsheds.	Stressor Effects
	Weather	Climate Change	Monitor key measurable climate change parameters to determine rate and extent of climate change in the UCBN.	Baseline
Geology and Soils	Geomorphology	Landslides	Track trends in landslides at HAFO.	Stressor Effects
		Channel/Bank Morphology	Track changes in morphology of stream bank and other riparian features in the UCBN.	Baseline
		Paleontological Resources	Monitor trends of in-situ paleontological resources in the UCBN.	Baseline
		Archaeological Resources	Determine the status and trends of visitor damage to in-situ archaeological resources.	Stressor Effects
		Cave features	Determine the type, rate, and extent of damage or impacts from visitors on UCBN geologic features.	Stressor Effects
		Volcanic features	Determine the type, rate, and extent of damage or impacts from visitors on UCBN geologic features.	Stressor Effects

Level 1	Level 2	UCBN Vital Sign	Monitoring Objective	Monitoring Category
		Cliffs and other geologic features	Determine the type, rate, and extent of damage or impacts from visitors on UCBN geologic features.	Stressor Effects
		Pictographs and rock inscriptions	Determine the status and track changes in pictographs and rock inscriptions in JODA and CIRO.	Baseline
	Soil Quality	Soil Erosion	Track trends in soil erosion	Baseline
		Soil Biota	Detemine the status and track changes in soil biota of UCBN riparian areas.	Baseline
		Bare soil surface	Track trends in the amount and spatial pattern of bare soil surface.	Baseline
		Soil Chemistry	Determine the status and trends of mercury contamination in sediments and soils of Lake Roosevelt.	Baseline
		Soil Compaction	Determine status and measure changes in soil compaction before and after park management and in areas of heavy visitor use.	Stressor Effects
		Biological Soil Crusts	Determine the status and trends of biological soil crust communities in sagebrush-steppe areas of the UCBN.	Baseline
		Biological Soil Crusts	Determine the status and trends of biological soil crust communities in sagebrush-steppe areas of the UCBN before and after prescribed and wildfire events.	Stressor Effects
Water	Hydrology	Surface Water Dynamics	Determine the status and trend of surface water quantity in the UCBN, including flow in streams, springs, and seeps.	Baseline
	Water Quality	Water Quality- Core Parameters	Track changes in core water quality parameters in the UCBN.	Stressor Effects

Level 1	Level 2	UCBN Vital Sign	Monitoring Objective	Monitoring Category
		Water quality- Nutrients	Track changes of nutrient levels in UCBN water bodies.	Stressor Effects
		Water Quality-Toxics	Track changes in toxic pollutant levels in water and sediment of Lake Roosevelt.	Stressor Effects
		Water Quality-Macroinvertebrates	Determine the status and track changes in the species and functional group composition of dragonflies and damselflies in the UCBN.	Baseline
		Water Quality-Macroinvertebrates	Determine the status and track changes in the species and functional group composition and abundance of aquatic macroinvertebrates in the UCBN.	Baseline
Biological Integrity	Invasive Species	Invasive Plants	Monitor the status and trend of invasive plants along roads, trails, and other park facilities.	Stressor Effects
		Invasive Plants	Document changes in established populations of invasive species, including response to treatment.	Baseline
		Invasive Plants	Use monitoring data for early detection & predictive modeling of incipient invasive species.	Baseline
		Exotic Vertebrates	Determine the status and track changes in populations of invasive exotic vertebrates in the UCBN.	Baseline
	Infestations and Disease	Forest Insect Pests	Monitor P-J woodlands in CIRO and other UCBN juniper systems for *Ips* infection.	Stressor Effects
		Forest Rust Disease	Monitor limber pine stands in CRMO for early detection and increase of white pine blister rust infection.	Baseline
	Focal species or Communities	Cave Biota	Determine the status and trend of cave-obligate organisms in CRMO.	Baseline
		Forest Structure	Track spatial and temporal patterns in the distribution, recruitment, and persistence of snags and downed wood in UCBN forest and woodlands ecosystems.	Baseline

Level 1	Level 2	UCBN Vital Sign	Monitoring Objective	Monitoring Category
		Ponderosa Pine Forests	Determine trends in ponderosa pine forest composition and structure in the UCBN.	Baseline
		Ponderosa Pine Forests	Track changes in composition, structure, and landscape pattern of ponderosa pine vegetation.	Baseline
		Pinyon-Juniper Communities	Track expansion of P-J woodland into sagebrush-steppe ecosystems of the UCBN.	Baseline
		Pinyon-Juniper Communities	Determine trends in pinyon-juniper vegetation composition and structure in the UCBN.	Baseline
		Pinyon-Juniper Communities	Track changes in composition, structure, and landscape pattern of pinyon-juniper vegetation.	Baseline
		Aspen Communities	Determine trends in aspen vegetation composition and structure in the UCBN.	Baseline
		Aspen Communities	Determine the reproductive status and trends of aspen in the UCBN.	Baseline
		Aspen Communities	Track changes in composition, structure, and landscape pattern of aspen vegetation.	Baseline
		Wetland/Riparian Communities	Determine trends in wetland and riparian vegetation composition and structure in the UCBN.	Baseline
		Wetland/Riparian Communities	Track changes in composition, structure, and landscape pattern of wetland and riparian vegetation.	Baseline
		Sagebrush Communities	Determine trends in sagebrush-steppe vegetation composition and structure in the UCBN.	Baseline
		Butterfly/Moth Communities	Identify important lepidoptera-plant relationships in the UCBN and track lepidoptera populations over time.	Baseline

Level 1	Level 2	UCBN Vital Sign	Monitoring Objective	Monitoring Category
		Invertebrate Communities	Determine the status and trend of selected invertebrate focal species and communities.	Baseline
		Freshwater Mussel Communities	Determine the status and trend of freshwater mussels in the Snake River adjacent to HAFO and along the John Day River at JODA.	Baseline
		Cold-water fish	Determine the status and trend of cold-water fish species of concern, including steelhead.	Baseline
		Frogs	Use monitoring data to determine the impact of spring drawdown of Lake Roosevelt on Pacific tree frog and long-toed salamander reproduction.	Stressor Effects
		Reptiles	Determine the status and track changes in the populations of relict and small populations of reptile species of concern.	Baseline
		Reptiles	Track changes in snake hibernacula.	Baseline
		Forest Bird Communities	Track forest obligate bird community composition, species abundance, and reproductive success.	Baseline
		Shrub-steppe Bird communities	Track sagebrush-steppe obligate bird community composition, species abundance, and reproductive success.	Baseline
		Wetland/Riparian Bird Communities	Track wetland/riparian obligate bird community composition, species abundance, and reproductive success.	Baseline
		Raptor Communities	Determine the status and trend of raptors that breed and winter in the UCBN.	Baseline
		Small Mammals	Determine the status and trend of habitat-specific small mammals, such as the water shrew, sagebrush vole, and Merriam's shrew in the UCBN?	Baseline
		Bats-Roosts	Identify and monitor roosts of pallid bat, Townsend's big-eared bat, and other colonial roosting bat species of concern in the UCBN.	Baseline
		Bats-Communities	Track spatio-temporal patterns of bat species presence and activity along important riparian foraging areas in the UCBN.	Baseline

Level 1	Level 2	UCBN Vital Sign	Monitoring Objective	Monitoring Category
		Network Species/Communities of Special Concern	Track changes in the areal extent and density of camas in relation to land use practices in NEPE and BIHO.	Stressor Effects
	At-risk Biota	State and Federal Species of Concern	Determine trends in populations of threatened, endangered, and at-risk species within the parks.	Baseline
		Federal T&E Species	Determine trends in populations of threatened, endangered, and at-risk species within the parks.	Baseline
		Peripheral/Relict Species	Monitor the distribution of peripheral vertebrate species, such as pika, pinyon mice, cliff chipmunk, ringtail, western whiptail, and northern mockingbird to track range expansion and contraction	Baseline
		Snag/Cavity Obligate Species	Determine the status and trend of snag and downed wood-dependent forest invertebrates and vertebrates in UCBN forest and woodland habitats.	Baseline
Human Use	Point Source Human Effects	Fire Control	Conduct pre and post prescribed fire monitoring of plant and animal communities in the UCBN.	Effectiveness
		Invasive Plant Control	Conduct pre and post control monitoring of plant communities in weed treatment areas in the UCBN.	Effectiveness
		Bioaccumulation of Toxins	Conduct monitoring of toxicity levels in selected species of waterfowl, fish, and other species at risk of bioaccumulations in Lake Roosevelt.	Stressor Effects
	Non-point Source Human Effects	Hunting	Conduct monitoring of at-risk natural resources during hunting season, conduct interviews of hunters, etc…to determine the extent and trend of impacts from within-park hunting and poaching.	Stressor Effects
	Consumptive Use	Grazing	Use monitoring data to determine the impacts of permitted livestock grazing in vulnerable ecosystems of CIRO, NEPE, and LARO.	Stressor Effects
		Visitor Usage	Track changes in visitation and in spatio-temporal patterns of park use by visitors.	Baseline
	Visitor and Recreation Use	Dark night sky	Track trends in UCBN viewsheds.	Stressor Effects
Ecosystem Pattern and Processes	Fire	Fire Dynamics	Track spatial and temporal changes and variability in wildfire events across the UCBN.	Baseline

Level 1	Level 2	UCBN Vital Sign	Monitoring Objective	Monitoring Category
		Fire Dynamics	Conduct pre and post fire monitoring of plant communities, including sagebrush-steppe and forested ecosystems of the UCBN.	Effectiveness
		Fire Dynamics	Conduct pre and post fire monitoring of vulnerable plant and animal communities and species.	Effectiveness
		Fuel Dynamics	Monitor pre and post thinning snag and downed wood resources in LARO.	Effectiveness
	Land Use and Cover	Land Use Change	Document changes in development, land conversion, and succession outside UCBN park boundaries.	Baseline
		Landscape Fragmentation and Connectivity	Determine trends in a suite of landscape metrics including patch shape, size, and connectivity	Baseline
		Viewshed	Track trends in UCBN viewsheds.	Stressor Effects
		Viewshed	Track trends in UCBN viewsheds.	Stressor Effects
		Viewshed	Track changes in UCBN viewsheds.	Stressor Effects
	Soundscapes	Soundscapes	Track changes in soundscapes in vulnerable UCBN parks, including WHMI, LARO, and NEPE.	Stressor Effects

Appendix N.   Top rated monitoring questions from the 2004 web-based survey. This survey was conducted following the March 2004 Vital Signs Scoping Workshop.

Is the abundance and / or distribution of invasive plants increasing along roads, trails, and other park facilities?
How are the composition and pattern of dominant community types changing over space and time?
Is the incidence of invasive plants increasing in prescribed fire units?
What is the ratio of native to invasive plant species in forested areas and is this ratio changing thru time?
Are fire regimes (frequency and severity) changing over time?
Are rates of soil erosion increasing due to current and/or historic land use practices?
How are potential natural riparian vegetation communities changing thru time?
What is the population status and trend of invertebrate indicator species in riparian and wetland areas?
What is the ratio of native species to invasive species of riparian vegetation and is this ratio changing thru time?
Are the management strategies effective at decreasing the incidence of invasive plants in riparian zones?
Are the number or extent of riparian sites at risk from invasive plants increasing?
Are the management strategies effective at decreasing the incidence of invasive plants in shrub-steppe habitats?
What is the population status and trend of vertebrate species of concern in shrub-steppe habitat?
What is the ratio of native species to invasive species of shrub-steppe vegetation and is this ratio changing thru time?
How are the composition and pattern of dominant community types changing over space and time?
Is the incidence of invasive plants increasing in prescribed fire units?
What is the status and trend of weed-free shrub-steppe communities?
What is the population status and trend of fish species of concern?

Appendix O.   Existing monitoring programs at Craters of the Moon National Monument.

Craters of the Moon National Monument
Annual Resource Management Program(s)

Activity	# of Sites	Frequency of Activity	Month(s) of Year	RMP P.S. #	Comments
AIR QUALITY					
NADP (Acid Rain) Monitor	1	1/week (Tues.)	1-12		One of 200 sites in a Natl. Network
Visibility Camera	1	1/10 days	1-12		Discontinued 9/30/01
Ozone Monitor (O_3)	1	1/week (Wed.)	1-12		DOE $
Ozone Monitor; Multi-point Calibration	1	1/month	1-12		DOE $
Dioxin	1	1/week	4 of 12		EPA $
IMPROVE (Fine Particulate) Monitor	1	Change Filters 1/week (Tues.)	1-12		
WILDLIFE					
Deer Survey (Spring)	Parkwide	As Observed	4-5		Staff record sightings of antlered/doe/yearlings
Deer Survey (Late Summer)	Northend	8 surveys	8.5 - 9.5		RMD Staff
Deer Survey (Road kills)	Parkwide	As Occurs	1-12		All staff report; Ranger Div. keeps Records
Radionuclide Deer Survey	Parkwide	As Occurs	6-10		Thyroids collected from road-kill mule deer
Deer Survey (Hunting)	Parkwide	As Observed	10-11		Ranger Division
Bird Survey (Suspended 96)	34	Each Site 1/yr	5-6		Sites stratified by vegt. type
Bird Survey (Current)	7 routes	Each route 1/yr	5-6		
Wildlife Observations	Parkwide	As Observed	1-12		Observations provided by all CRMO staff

Activity	# of Sites	Frequency of Activity	Month(s) of Year	RMP P.S. #	Comments
Winter Eagle Count	Park Area	Once/year	1		
GEOLOGICAL					
Geologic Features Photo-points	18	1/year	5-8		SCA Resource Assistant Project
Stay-on-the-Trail Survey	5	5 times/site	5-8		SCA Resource Assistant Project
Cave Monitoring					In Development
VEGETATION					
Comparative Photo Study	42	7 photos/year	6-7		(Wright, 1992)
Vegetation Transects	8	Every 4 years	6-7		
Little Prairie Fire Study	5	Every 4 years	6-7		Within 2,000 acre burn in 1992
Echo Crater Campsites	3	1/year	9		Photo-Points
Exotic Vegetation Control (Mechanical)	Multiple	As needed	5-9		HQ Complex 5-9, Hwy. 7-9
Exotic Vegetation Control (herbicide spraying)	Multiple	As needed	5-6		Spotted, diffuse, and Russian knapweed
Hazard Tree Assessment	Developed Areas	once/year	5		Approximately 55 trees were being monitored annually
ADMINISTRATIVE/ MISC.					
Investigator's Annual Report	NA	1/year	1-2		Report summarizing research activities during the year
Resource Management Plan Update	NA	1/year	2-3		Update project statements, FTE, and funded projects and priority of proposed but unfunded projects.

Appendix P.   Available Geographic Information System (GIS) and Remotely Sensed (RS) data for the Upper Columbia Basin.

A tremendous amount of GIS and RS data have been developed and gathered for lands encompassed by the UCBN. Over 170 different data layers were compiled or created in support of the Interior Columbia Basin Ecosystem Management Project, whose boundary includes >90% of the network. Gap Analysis Projects have been completed in each of the 4 states, generating 300+ vertebrate species models and supporting data per state. In addition, over a dozen well-known groups specializing in GIS and RS research and data delivery reside in the region. These information sources include the Wildlife Spatial Analysis Lab (Univ. of Montana), USFS Fire Sciences Lab (Univ. of Montana), Montana Natural Resource Information System, Landscape Dynamics Lab (Univ. of Idaho), Remote Sensing and GIS Research Lab (Univ. of Idaho), Inside Idaho (Univ. of Idaho), Idaho Department of Water Resources, GIS Training and Research Center (Idaho State Univ.), Oregon Geospatial Data Clearinghouse, Oregon / Washington Bureau of Land Management, Washington Department of Ecology, Washington Department of Transportation, USFS Pacific Northwest Research Station, USGS Snake River Field Station, StreamNet, and SageMap.

The majority of data available in the region are mid to broad-scale (1:100,000 – 1:500,000), providing excellent opportunities to develop long-term monitoring schemes within the "big picture" context. Many fine scale (1:24,000) data layers are also available and, given the expertise in the region, additional park and management specific data could easily be generated. The following table identifies GIS and RS data currently available.

Theme	Data	Scale	BIHO	CIRO	CRMO	HAFO	MIIN	NEPE	JODA	LARO	WHMI
Air/Climate	Air Quality Point Source Emissions	1:100	X	X	X	X	X	X	X	X	X
	Superfund Sites	1:100			X						
	Weather (8 Variables)	1:100	X	X	X	X	X	X	X	X	X
Hydrology	Rivers	1:100	X	X	X	X	X	X	X	X	X
	Lakes	1:100	X	X	X	X	X	X	X	X	X
	Gaging Stations	1:100	X	X	X	X		X	X	X	X
	Impoundments	1:100	X	X	X	X	X	X	X	X	X
	Water Quality Stations	1:100	X	X	X	X	X	X	X	X	X
	Springs	1:100	X		X	X		X		X	X
	Waterholes	1:100			X						
	Wetlands	1:100	X								
	Basin and Subbasin Boundaries	1:100	X	X	X	X	X	X	X	X	X

Theme	Data	Scale	BIHO	CIRO	CRMO	HAFO	MIIN	NEPE	JODA	LARO	WHMI
	Pollutant Sources	1:100		■	■	■	■	■	■	■	■
	Water Quality Impaired Lakes and Streams	1:100		■	■	■	■	■	■	■	■
	Water Stress Index	1:100	■	■	■	■	■	■	■	■	■
	Contours	Varies	■						■		
	Digital Elevation Model	30m	■						■		
	Digital Elevation Model	10m						part			
	Land Slides	1:24							■		
	Paleontological Sites	1:24							■		
	Geology	Varies		■	■						
Topography/Geology	Soil Survey	1:24			part	■	■				
	Caves	1:24			part						
	Nutrient Availability Index	1:100	■	■	■	■	■	■	■	■	■
	Bedrock Mineral Content	1:100	■	■	■	■	■	■	■	■	■
	Major Lithology	1:100	■	■	■	■	■	■	■	■	■
	Low-Temperature Geothermal Sites	1:100	■	■	■	■	■	■	■	■	■
	Mines (Mineral Industry Locator System)	1:100	■	■	■	■	■	■	■	■	■
	Land Cover	1:100	■	■	■	■	■	■	■	■	■
	Land Cover	1:24			part						
	Weed Locations	1:24			part				■	■	
	Weed Treatments	1:24								part	
	Kipukas	1:24			■						
	Rare Plant Locations	1:100			part						
Vegetation	Vegetation Transects	1:24			part						
	Forest Health Vegetation Vulnerability	1:100	■	■	■	■	■	■	■	■	■
	Rangeland Health Vegetation Vulnerability	1:100	■	■	■	■	■	■	■	■	■
	Distribution Artemisia tridentata (Double CO_2)	1:100	■	■	■	■	■	■	■	■	■
	Distribution Pinus Ponderosa (Double CO_2)	1:100	■	■	■	■	■	■	■	■	■
	Historic (1936) Vegetation	1:100									
	Net Primary Productivity	1:100	■	■	■	■	■	■	■	■	■

Theme	Data	Scale	BIHO	CIRO	CRMO	HAFO	MIIN	NEPE	JODA	LARO	WHMI
Wildlife	Sage Grouse Leks	1:100			▪	▪	▪				
	Sensitive Species Locations	1:100		▪	▪	▪	▪	▪			
	Breeding Bird Survey Routes	1:100		▪	▪	▪	▪				
	Relative Aquatic Integrity	1:100		▪	▪	▪	▪				
	Fish Species Ranges, Current and Historic	1:100		▪	▪	▪	▪				
	Wildlife Habitat Relationship Models	1:100	▪								
Political	State Boundaries	1:100	▪	▪	▪	▪	▪	▪	▪	▪	▪
	County Boundaries	1:100	▪	▪	▪	▪	▪	▪	▪	▪	▪
	Cities	1:100	▪	▪	▪	▪	▪	▪	▪	▪	▪
	Park Boundaries	1:100	▪	▪	▪	▪	▪	▪	▪	▪	▪
	Ownership	1:100	▪	▪	▪	▪	▪	▪	▪	▪	▪
	Parcel Tracts	1:24						part			
	Other Protected Areas	1:100	▪	▪	▪	▪	▪	▪	▪	▪	▪
	Wilderness Study Areas	1:100		▪	▪			▪			
	Campgrounds / Parking Areas	1:100	▪	▪	▪						
	Highway Mile Markers	1:100			▪						
	Road Density	1:100		▪	▪	▪	▪	▪	▪	▪	▪
	Roads	1:100	▪	▪	▪	▪	▪	▪	▪	▪	▪
	4WD Roads	1:100	▪	▪	▪	▪	▪	▪	▪		
	Trails	1:100	▪	▪	▪	▪	▪	▪	▪		
	Utility Corridors	1:100	▪						▪	▪	▪
	Railroads	1:100									▪
Cultural	Archeological Sites	1:24			part			▪			
	Historic Photo Series Locations	1:24			▪						
	Structures	1:24	▪		▪			part			
	Historic Trails	1:24			▪						
	Cultural Resource Sites	1:24						part			
	Scenic Integrity	1:100		▪	▪	▪	▪	▪	▪	part	
	Human Population Information	1:100	▪	▪	▪	▪	▪	▪	▪	▪	▪
	Tribal Reservations and Ceded Lands	1:100		▪	▪	▪	▪	▪	▪	▪	▪

Theme	Data	Scale	BIHO	CIRO	CRMO	HAFO	MIIN	NEPE	JODA	LARO	WHMI
Disturbance	Fire Ignition Locations	1:100	X					X			
	Fire Boundaries / History	1:100			X	X	X				
	Fire Treatment Areas	1:24							X		
	Current (1990) Fire Regime	1:100		X	X			X			X
	Historic (1900) Fire Regime	1:100			X						
	Grazing Allotments	1:100			X			part			
	Landfill	1:24			X						
Remotely Sensed / Base Layers	Quad Boundaries	1:24	X	X	X	X	X	X			X
	Quad Boundaries	1:100	X	X	X	X	X	X			X
	Digital OrthoPhoto Quads	Varies	X	X	X	X					X
	Digital Raster Graphics	Varies	X	X							
	Aerial Photos	Varies	X						X	X	
	SPOT panchromatic	2.5m		X	X	X		part			
	SPOT panchromatic	10m		X	X	X		part			
	ASTER	15m	X	X	X	X	X	X	X	X	X
	LandSat	30m	X	X	X	X	X	X	X	X	X

Appendix Q.   Species Common and Scientific Names

Vascular Plants

American bulrush (*Scirpus americanus*)
antelope bitterbrush (*Purshia tridentata*)
basin big sage (*Artemisia tridentata* ssp. *tridentata*)
basin wildrye (*Leymus cinereus*)
bluebunch wheatgrass (*Pseudoroegneria spicata)*
bottlebrush squirreltail (*Elymus elymoides*)
camas (*Camassia quamash*)
cedar (Family Cupressaceae)
cheatgrass (*Bromus tectorum*)
cottonwood (*Populus spp.*)
crested wheatgrass (*Agropyron cristatum*)
Douglas-fir (*Pseudotsuga menzeisii*)
grand fir (*Abies grandis*)
gray horsebrush (*Tetradymia canescens*)
gray rabbitbrush (*Chrysothamnus nauseosus*)
greasewood (*Sarcobatus vermiculatus*)
green rabbitbrush (*Chrysothamnus viscidiflorus*)
hardstem bulrush (*Scirpus lacustris ssp. glaucus*)
hemlock (*Tsuga spp.*)
Idaho fescue (*Festuca idahoensis*)
knapweeds (*Centaurea spp.*)
limber pine (*Pinus flexilis*)
lodgepole pine (*Pinus contorta*)
low sagebrush (*Artemisia arbuscula*)
medusahead (*Taeniatherum asperum*)
mountain alder (*Alnus incana*)
mountain big sage (*Artemisia tridentata vaseyana*)
obscure phacelia (*Phacelia inconspicua*)
picabo milkvetch (*Astragalus oniciformis*)
pine (*Pinus spp.*)
pinyon pine (*Pinus monophylla*)
ponderosa pine (*Pinus ponderosa*)
quaking aspen (*Populus tremuloides*)
reed canary-grass (*Phalaris arundinacea*)
Rocky Mountain juniper (*Juniperus scopularum*)
Russian knapweed (*Centaurea repens*)
Russian olive (*Eleagnus angustifolia*)
Sandberg bluegrass (*Poa sandbergii*)
silver sage (*Artemisia cana*)
softstem bulrush (*Scirpus lacustris ssp. validus*)
spike-rush (*Eleocharis spp.*)

subalpine fir (*Abies lasiocarpa*)
thistles (*Cirsium spp.)*
threadleaf sedge (*Carex filifolia*)
three-tip sage (*Artemisia tripartita)*
Thurber's needlegrass (*Stipa thurberiana*)
Utah juniper (*Juniperus osteosperma*)
western juniper (*Juniperus occidentalis*)
western larch (*Larix occidentalis*)
western white pine (*Pinus monticola*)
willow (*Salix spp.*)
Wyoming big sage (*Artemisia tridentata wyomingensis*)

Vertebrates

Arctic greyling (*Thyallus arcticus*)
bald eagle (*Haliaetus leucocephalus*)
black bear (*Ursus americanus*)
black crowned night-heron (*Nycticorax nycticorax*)
bobcat (*Lynx rufus*)
Brewer's sparrow (*Spizella breweri*)
bullfrog (*Rana pipiens*)
bull trout (*Salvelinus confluentus*)
Clark's nutcracker (*Nucifraga columbiana*)
Cliff chipmunk (*Tamias dorsalis*)
Columbia spotted frog (*Rana luteiventris*)
common garter snake (*Thamnophis sirtalis*)
Cooper's hawk (*Accipiter cooperii*)
ferruginous hawk (*Buteo regalis*)
gray wolf (*Canis lupus*)
great blue heron (*Ardea herodias*)
long-legged myotis (*Myotis volans*)
mountain lion (*Felis concolor*)
northern mockingbird (*Mimus polyglottus*)
osprey (*Pandion haliaetus*)
pallid bat (*Antrozous pallidus*)
peregrine falcon (*Falco peregrinus*)
pika (*Ochotona princeps*)
piñon mouse (*Peromyscus truei*)
pygmy rabbit (*Brachylagus idahoensis*)
red squirrel (*Tamiasciurus hudsonicus*)
ringtail (*Bassariscus astutus*)
rough-legged hawk (*Buteo lagopus*)
sage grouse (*Centrocercus urophasianus*)
sage sparrow (*Amphispiza belli*)
sage thrasher (*Oreoscoptes montanus*)
sharp-shinned hawk (*Accipiter striatus*)

silver-haired bat (*Lasionycteris noctivagans*)
spotted bats (*Euderma maculatum*)
steelhead (*Onchorhynchus mykiss*)
Swainson's hawk (*Buteo swainsonii*)
Townsend's big-eared bat (*Corynorhinus townsendii*)
vesper sparrow (*Poocetes gramineus*)
western toad (*Bufo boreas*)

Invertebrates

blind cave leiodid beetle (*Glacicavicola bathyscioides*)
Bliss Rapids snail (*Taylorconcha serpenticola*)
Desert valvata (*Valvata utahensis*)
Idaho dunes tiger beetle (*Cicindela waynei*)
Idaho point-headed grasshopper (*Acrolophitus pulchellus*)
pinyon ips beetle (*Ips confusus*)
Snake River physa (*Physa natricina*)